

REMARKS

The Office has removed the 35 U.S.C. § 112, second paragraph, rejection and the 35 U.S.C. § 103(a) rejections over Sato et al., U.S. Patent Application Publication No. 2007/0031729 ("Sato"), and over Kikuyama et al., JP 2004-247176, in view of Nakagawa et al., U.S. Patent Application Publication No. 2006/0068296, that were made in the first Action. The Office is now rejecting the claims under 35 U.S.C. § 103(a) over the corresponding international publication of Sato, WO 02/076924, in view of Murai et al., U.S. Patent No. 7,097,944 ("Murai").

The Combination of Sato, WO 02/076924, and Murai Does Not Support a Case of Prima Facie Obviousness under 35 U.S.C. § 103(a) of Claims 1-9

The invention of Murai is a nonaqueous secondary cell in which the electrolyte comprises a nonaqueous solvent, a lithium compound and a combination of a vinyl ethylene carbonate compound and at least one of a group of compounds that includes vinylene carbonate. Nothing is disclosed in Murai concerning the use of a quaternary salt in the electrolyte.

Applicants respectfully submit that a person of ordinary skill in the art could not have reasonably predicted the results of using the vinylene carbonate of the electrolyte of Murai in the electrolyte of the nonaqueous secondary cell of Sato, WO 02/076924.

An electrolyte containing a quaternary salt as in Sato, WO 02/076924, has different properties from an electrolyte as disclosed in Sato, 02/076924, which does not contain such salts, as evidenced by Murai itself. In the absence of evidence or proper reasoning showing that a person of ordinary skill in the art would have reasonably expected the effects of vinylene carbonate in the electrolyte of Sato, WO 02/076924, to be reasonably equivalent to the effects of vinylene carbonate in the electrolyte of Murai, the rejection cannot stand. The Office has not provided any evidence or reasoning supporting the required expected equivalency.

Moreover, the teachings and comparative data in Murai lead away from the use of vinylene carbonate (VC) in the electrolyte of Sato. Murai teaches, as shown in the Tables, that an excellent effect is obtained in the nonaqueous secondary cells disclosed therein when both vinyl ethylene carbonate (VEC) and VC are added to a lithium salt. For example, Table 1, Examples 1 to 7, show capacity retention is 72 to 85 % when both vinyl ethylene carbonate (VEC) and VC are used. This result is significantly better as compared with the result of Comparative Example 1 wherein neither VEC nor VC are used, i.e., capacity retention is 12 %. In Comparative Example 3, where only VC is used, capacity retention is only 34 %.

From these data, it is clear that VEC is an essential component and that VC does not contribute significantly to an increase of capacity retention.

The Comparative Data in the Present Specification  
Demonstrate Criticality for the Range of VC

Furthermore, notwithstanding the lack of prima facie obviousness supported by the combination of Sato, WO 02/076924, the comparative data in the present specification show that the use, in a nonaqueous electrolytic lithium secondary cell as in the present invention which contains a room temperature molten salt which is an aliphatic quaternary ammonium salt of the formula (1), of an electrolytic solution containing VC in an amount of from 1 to 5 wt. % based on the electrolytic solution provides unexpectedly superior performance characteristics as opposed to the use of an amount of VC outside this range.

The superior properties are demonstrated by the data of Table 2 of the application (as amended in the Preliminary Amendment [34(2)b amendment] filed with the application papers on May 3, 2006). Referring to the data of amended Table 2, when VC is used in an amount of 1 to 5 %, capacity retention is 87 to 93 %. However, when VC is used in an amount of 0.5 % as in Comparative Example 8, capacity retention is 70.3 %. When VC is used in an

amount of 5.3 % as in Comparative Example 7, capacity retention is 42 %.

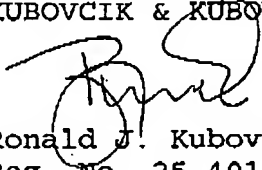
These data support criticality of the range of VC and rebut any prima facie obviousness considered by the Office to be supported by the combination of Sato, WO 02/076924, and support the patentability under 35 U.S.C. § 103(a) of the claims of the present application.

Removal of the 35 U.S.C. § 103(a) rejection of claims 1-9 under 35 U.S.C. § 103(a) over WO 02/076924 in view of U.S. Patent No. 7,097,944 and an allowance of the claims are in order and are respectfully solicited.

The foregoing is believed to be a complete and proper response to the Office Action dated January 22, 2009

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional required fees may be charged to Deposit Account No. 111833.

Respectfully submitted,  
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PATENT APPLN. NO. 10/578,092  
RESPONSE UNDER 37 C.F.R. §1.111

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NON-FINAL

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